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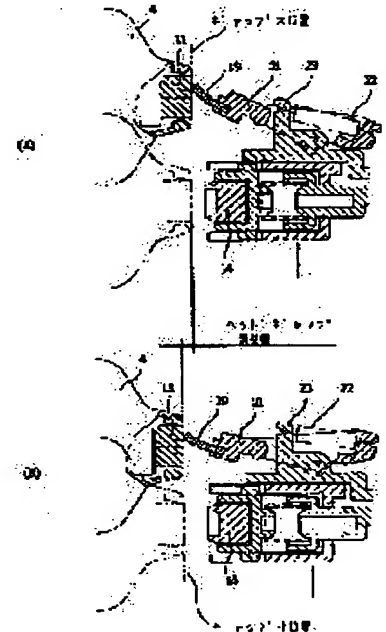
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(54) CLEANER FOR INK JET HEAD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a cleaner for ink jet head which can exhibits a stabilized wiping performance constantly even when a gap between an ink jet head and a paper is adjusted.

SOLUTION: A wiper blade 19 is supported by a first supporting member 21 such that a wiper blade 19 abuts resiliently, at the forward end thereof, against a jet nozzle 11 and the forward end is bent in the moving direction when an ink jet head 4 abuts against the wiper blade 19 through movement of the ink jet head 4. The first supporting member 21 is supported by a second supporting member 23 rotatably in the bending direction of the wiper blade 19 such that the force for bending the wiper blade 19 is decreased and the first supporting member 21 is urged by a spring 22 to sustain the wiper blade 19 in bending state while resisting against the rotational force of the first supporting member 21.



LEGAL STATUS

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CLAIMS

[Claim(s)]

[Claim 1] Cleaning equipment which is characterized by providing the following and which wipes off the ink injection side of the ink-jet head which carries out both-way movement by contact of the wiper blade formed by the elastic body to shaft orientations. 1st supporter material which supports the aforementioned wiper blade by the contact to the aforementioned ink-jet head and the aforementioned wiper blade accompanying movement of the aforementioned ink-jet head so that the aforementioned point may be crooked in the aforementioned move direction so that the elastic contact of the point of the aforementioned wiper blade may be attained to the aforementioned ink injection side. the energization which energizes the supporter material of the above 1st so that the force of making the aforementioned wiper blade crooked may be decreased, the aforementioned rotation force of the 2nd supporter material which supports the supporter material of the above 1st possible [rotation] in the aforementioned crookedness direction of the aforementioned wiper blade, and the supporter material of the above 1st may be resisted and crookedness of the aforementioned wiper blade may be maintained -- a member

[Claim 2] The supporter material of the above 2nd is cleaning equipment of the ink-jet head according to claim 1 characterized by being prepared free [movement] so that the aforementioned wiper blade may be moved to a contact position and an evacuation position to the aforementioned ink injection side.

[Claim 3] The supporter material of the above 2nd is cleaning equipment of the ink-jet head according to claim 2 characterized by for rotation operation of the aforementioned cam being interlocked with and preparing the aforementioned wiper blade free [movement in the aforementioned contact position and the aforementioned evacuation position] by being guided to the cam groove formed on the cam.

[Claim 4] The aforementioned energization member is cleaning equipment of an ink-jet head given in any 1 term of the claim 1 characterized by preparing for the supporter material of the above 2nd, or a claim 3.

[Claim 5] Cleaning equipment of an ink-jet head given in any 1 term of the claim 1 characterized by being used for the ink-jet type printer equipped with the gap adjustment mechanism in which the gap of an ink-jet head and a record form can be changed, or a claim 4.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the technical field of the cleaning equipment of an ink-jet head used for an ink-jet type printer etc.

[0002]

[Description of the Prior Art] as the equipment which cleans the injection nozzle side of the injection nozzle of an ink-jet head, prevents or cancels the plugging or sucks out ink to an injection nozzle in the conventional ink-jet type printer etc. at the time of ink cartridge exchange -- an injection nozzle side -- opening and closing -- free -- a wrap cap member and the cap concerned -- it has recovery equipment equipped with the pumping plant connected with the suction crevice of a member

[0003] However, when such recovery equipment performed suction recovery action, ink may have adhered to the injection nozzle side and a printing halt carried out predetermined-time continuation in such the state, there was a case where plugging of an injection nozzle occurred.

[0004] Then, the injection nozzle side was wiped off by forming the wiper blade 31 in which both-way operation is free in the direction of arrow N to the injection nozzle 30 of an ink-jet head, and making an injection nozzle side carry out the elastic contact of the wiper blade 31 concerned conventionally, as shown in drawing 6 .

[0005] Although suction recovery action is performed by sticking the suction cap 32 to an injection nozzle 30 with the equipment shown in drawing 6 , the suction cap 32 is evacuated, and after suction recovery action is completed, as shown in drawing 6 (A), as shown in drawing 6 (B), next, a wiper blade 31 is advanced to an injection nozzle 30 side. If an injection nozzle is moved to a record position as shown in drawing 6 (C) since the nose of cam of a wiper blade 31 is located in the position which laps with an injection nozzle 30 at this time, a wiper blade 31 will contact an injection nozzle side in the state where carried out elastic contact and it bent in the injection nozzle 30. Therefore, as an injection nozzle 30 shows drawing 6 (D), in the process which moves further, wiping of the injection nozzle side by the wiper blade 31 is performed, and as shown in drawing 6 (E), a wiping process ends a wiper blade 31 by evacuating to the position which does not contact an injection nozzle 30.

[0006]

[Problem(s) to be Solved by the Invention] However, in the aforementioned conventional example, since it wiped off with the amount d of overlap to the elasticity determined according to the configuration and the quality of the material of wiper rubber, and the injection nozzle 30 shown in drawing 6 (B) and the load was determined, when the ink-jet head had the gap with paper adjusted corresponding to thickness-of-paper change, dispersion might be produced in the amount of overlap and dispersion might be produced at the contact angle of the wiper blade 31 to a wiping load and an injection nozzle side.

[0007] That is, when the gap of paper and an injection nozzle side is small, the contact angle to the injection nozzle side of a wiper blade 31 becomes small being shown in drawing 7 (A) compared with the case where the gap of paper and an injection nozzle side is large, as shown in drawing 7 (B). And when the contact angle was small in this way, the wiper blade 31 might change into the field contact state to the injection nozzle side, and the wiping performance might fall.

[0008] Therefore, there was a problem that a wiping performance is changed whenever gap adjustment of an ink-jet head and paper is performed, and the stable injection nozzle side could not be cleaned.

[0009] Then, even if this invention is a case as gap adjustment of an ink-jet head and paper was performed, it makes it the technical problem to offer the always stabilized cleaning equipment of the ink-jet head which can wipe off and can demonstrate a performance.

[0010]

[Means for Solving the Problem] The cleaning equipment of an ink-jet head according to claim 1 In order to solve the aforementioned technical problem, the ink injection side of the ink-jet head which carries out both-way movement to shaft orientations So that it may be cleaning equipment wiped off by contact of the wiper blade formed by the elastic body and the elastic contact of the point of the aforementioned wiper blade may be attained to the aforementioned ink injection side By and the contact to the aforementioned ink-jet head and the aforementioned wiper blade accompanying movement of the aforementioned ink-jet head So that the aforementioned point may be crooked in the aforementioned move direction, and the force of making the 1st supporter material and aforementioned wiper blade which supports the aforementioned wiper blade crooked may be decreased It is characterized by having the 2nd supporter material which supports the supporter material of the above 1st possible [rotation] in the aforementioned incurvation direction of the aforementioned wiper blade, and the energization member which energizes the supporter material of the above 1st so that the aforementioned rotation force of the supporter material of the above 1st may be resisted and incurvation of the aforementioned wiper blade may be maintained.

[0011] If a wiper blade is moved by the 1st supporter material to a predetermined position according to the cleaning equipment of an ink-jet head according to claim 1, the point of a wiper blade carries out elastic contact with movement of an ink-jet head at an ink-jet head, and the point concerned will be crooked in the move direction of the aforementioned ink-jet head, and will contact the ink injection side of an ink-jet head at a predetermined contact angle. Therefore, if the interval of an ink injection side and a wiper blade becomes small, although the force of making the aforementioned wiper blade crooked will become large, since the supporter material of the above 1st is supported possible [rotation] in the aforementioned crookedness direction to the 2nd supporter material, the force of making the aforementioned wiper blade crooked by rotation of the 1st supporter material concerned decreases. However, since the supporter material of the above 1st resists the aforementioned rotation force by the energization member and is energized, crookedness of the aforementioned wiper blade is maintained to some extent. Consequently, it is not based on the size of the ink injection side of an ink-jet head, and the interval of a wiper blade, but the stable wiping performance to the ink injection side of a wiper blade is demonstrated.

[0012] The cleaning equipment of an ink-jet head according to claim 2 is characterized by being prepared free [movement] so that the supporter material of the above 2nd may make the aforementioned claim 1 move the aforementioned wiper blade to a contact position and an evacuation position to the aforementioned ink injection side in the cleaning equipment of the ink-jet head of a publication.

[0013] Since a wiper blade is moved to a contact position and an evacuation position by the 2nd supporter material to an ink injection side, while performing the above stable wiping operation at the time of wiping of an ink injection side according to the cleaning equipment of an ink-jet head according to claim 2, at the time of non-wiping, wiping operation by the desired procedure is performed so that it may consider as an ink injection side and the state where it does not contact.

[0014] The cleaning equipment of an ink-jet head according to claim 3 carries out that the supporter material of the above 2nd is interlocked with rotation operation of the aforementioned cam, and the aforementioned wiper blade is prepared in it free [movement in the aforementioned contact position and the aforementioned evacuation position] by being guided to the cam groove formed on the cam as the feature in the cleaning equipment of an ink-jet head given in the aforementioned claim 2.

[0015] According to the cleaning equipment of an ink-jet head according to claim 3 the [aforementioned], since the 2nd supporter material is guided to the cam groove formed on the cam, rotation operation of a cam is interlocked with and a wiper blade is moved to the contact position and evacuation position to an ink injection side While performing the above stable wiping operation at the time of wiping of an ink injection side, at the time of non-wiping, wiping operation of the procedure of the request by rotation operation of a cam is performed so that it may consider as an ink injection side and the state where it does not contact.

[0016] The cleaning equipment of an ink-jet head according to claim 4 is characterized by equipping the supporter material of the above 2nd with the aforementioned energization member in the cleaning equipment of an ink-jet head given in any 1 term of the aforementioned claim 1 or a claim 3.

[0017] since the supporter material of the above 1st is energized by the aforementioned energization member with which the supporter material of the above 2nd was equipped according to the cleaning equipment of an ink-jet head according to claim 4 -- the supporter material of the above 1st -- the supporter material of the above 2nd -- receiving -- a rotatable -- and it is energized and supported and the amount of crookedness of a wiper blade is stabilized

[0018] The cleaning equipment of an ink-jet head according to claim 5 is characterized by being used for the ink-jet type printer which equipped any 1 term of the aforementioned claim 1 or a claim 4 with the gap adjustment mechanism in which the gap of an ink-jet head and a record form can be changed, in the cleaning equipment of the ink-jet head of a publication.

[0019] According to the cleaning equipment of an ink-jet head according to claim 5, even when the gap of an ink-jet head and a record form is changed according to a gap adjustment mechanism, the amount of crookedness of the stable wiper blade is maintained, and stable wiping operation is performed.

[0020]

[Embodiments of the Invention] Hereafter, the form of operation of this invention is explained based on an accompanying drawing. Drawing 1 is drawing showing the outline composition of the ink-jet type printer 1 in this operation form. As shown in drawing 1, the ink-jet type printer 1 in this operation form is equipped with the platen 2 of the shape of a cylinder prolonged in shaft orientations, and the platen 2 concerned is attached in the direction of arrow H possible [rotation] through the shaft which is not illustrated at the frame 3.

[0021] The ink injection head 4 is laid on carriage 5 so that this platen 2 may be countered, and carriage 5 is engaging with the timing belt 9 twisted around the pulleys 7 and 8 of a couple while being supported possible [sliding] by the guide rod 6 prepared in parallel with the shaft of a platen 2. Therefore, one pulley 7 rotates with the carriage drive motor 10, and carriage 5 is moved in the direction of arrow K along with a platen 2 by sending a timing belt 9.

[0022] The ink injection head 4 which reciprocates to record within the limits beforehand defined according to such a mechanism at the time of record is equipped with two or more injection nozzles 11 which have many injection tips prepared corresponding to many ink passage which is not illustrated and these ink passage, respectively. And if the drive circuit which is not illustrated based on instructions of the control unit which the diaphragm which ink is supplied to the aforementioned ink passage from the ink feeder which was fixed to the frame 3 or was laid in carriage 5, and which is not illustrated, and forms the wall of the aforementioned ink passage does not illustrate deforms, ink will be injected from the injection tip of an injection nozzle 11 by the pressure variation resulting from the deformation. Ink is injected with movement of carriage 5 by the record form 12 supplied between a platen 2 and the ink injection head 4, and, thereby, the picture for one line is formed. If the image formation for one line is completed, the record form 12 will be sent by rotation of a platen 2 by one line, and formation of the picture for one line will be performed again. Image formation of the record form 12 whole is performed by this repeat. In addition, the record form 12 is supplied in the direction of arrow L from the form feed hopper which is not illustrated behind a frame 3, is sent in the direction of arrow M by rotation of a platen 2, and is discharged from the form exhaust port which is not illustrated.

[0023] After the above record operation is completed, although the ink injection head 4 is evacuated to a non-recording position, recovery equipment 13 is formed in the position which counters the ink injection head 4 in this non-recording position. recovery equipment 13 is formed in the side of a platen 2 -- having -- **** -- the cap made of rubber -- it has the member 14 this cap -- the case where the crevice of an injection nozzle 11 and the corresponding rectangle is formed in the member 14, and carriage 5 has moved to the position of recovery equipment 13 at the time of a printing operation halt -- cam 15 grade -- using -- a cap -- a member 14 is moved and the injection nozzle 11 of the ink injection head 4 is made to fit into a fluid-tight state

[0024] the aforementioned cap -- the cap whom the aforementioned crevice of a member 14 is connected with the pump 16 and tube 17 which operate by the aforementioned cam 15 as shown in drawing 2 (A), and the remains ink of an injection nozzle 11 has in a fitting state as mentioned above -- it is drawn in through the aforementioned crevice of a member 14, and the attracted ink is discharged by the waste fluid form 18 from exhaust port 16a

[0025] Moreover, the aforementioned recovery equipment 13 is adjoined, cleaning equipment 20 equipped with the wiper blade 19 formed by EPDM rubber, polyurethane, the craton, the tera tongue, etc. is formed, and the operation which wipes off the ink which remains in the apical surface of the injection nozzle 11 after making it move forward or retreat in the direction of N which shows a wiper blade 19 to drawing 1 according to rotation of a cam 15 and being drawn in as mentioned above is made.

[0026] Next, the cleaning equipment 20 in this operation form is explained in detail. It is the side elevation which drawing 2 (A) regarded the side elevation seen from [of drawing 1] arrow A, and drawing 2 (B) as the B-B cross section of drawing 2 (A), and drawing 2 (C) regarded as the direction of arrow A from opposite direction.

[0027] it is shown in drawing 2 (B) and (C) -- as -- a wiper blade 19 -- a cap -- the back end section is supported to the 1st supporter material 21 which adjoined the member 14 and was prepared -- having -- **** -- the 1st supporter material 21 concerned -- energization -- a member -- it is supported possible [rotation] in the direction of arrow Q by the rotation medial axis 24 through the spring 22 at the 2nd supporter material 23 Moreover, the 2nd supporter material 23 is engaging with the cam 15 by cam-follower 23a, moves in the direction of arrow N with rotation operation of a cam 15, and moves a wiper blade 19 to a contact position and an evacuation position with an injection nozzle 11.

[0028] the above composition -- setting -- a cap -- where suction operation using the member 14 is completed, the 2nd supporter material 23 is in the position shown in drawing 3 (A), and the wiper blade 19 is put on the evacuation position which does not contact an injection nozzle 11 However, in the predetermined timing which suction operation ends and the ink injection head 4 moves to a record position, as shown in drawing 3 (B), by rotation operation of a cam

15, the 2nd supporter material moves forward to an injection nozzle 11 side, and moves a wiper blade 19 to the position which laps with an injection nozzle 11. Therefore, in the process which the ink injection head 4 moves as shown in drawing 3 (C), an injection nozzle 11 contacts a wiper blade 19, and rotates the 1st supporter material 21 in the direction of arrow Q. However, since it is energized so that the 1st supporter material 21 may resist with the aforementioned rotation force with a spring 22 at this time, a wiper blade 19 crooks and contacts the injection nozzle side of an injection nozzle 11, and comes to have a predetermined contact angle to an injection nozzle side.

[0029] And in the process of the further movement of the ink injection head 4 as shown in drawing 4 (B) from drawing 4 (A), an injection nozzle side is ****(ed), wiping operation is performed, as shown in drawing 4 (C), when the 2nd supporter material 23 moves with rotation operation of a cam 15, a wiper blade 19 moves a wiper blade 19 to an evacuation position, and a series of wiping operation ends it.

[0030] Thus, since the cleaning equipment 20 of this operation form energizes the 1st supporter material 21 with a rotatable and a spring 22 and is supporting it to the 2nd supporter material 23 while it makes an injection nozzle side crooked and makes a wiper blade 19 contact, it can set up the wiping load over an injection nozzle side appropriately with the spring 22 concerned. To furthermore, the position of the ink injection head 4 shown in drawing 5 (A) from the position of the ink injection head 4 shown in drawing 5 (B) If gap adjustment to the paper of the ink injection head 4 is performed, although the force of the amount of overlap to the injection nozzle 11 of a wiper blade 19 becoming large, and making a wiper blade 19 crooked will increase It is alike with rotation operation of the 1st supporter material 21, and a part for the increase concerned is absorbed more, change of the amount of crookedness of a wiper blade 19 is suppressed very small, and, in it, a field contact state and a bird clapper are not to an injection nozzle side. [of 19 wiper blade]

[0031] Therefore, according to this invention, even when changing the amount of overlap of the wiper blade 19 to an injection nozzle 11, dispersion in the contact angle of the wiper blade 19 to an injection nozzle side can be suppressed, and stable wiping operation can be performed.

[0032] In addition, although the operation gestalt mentioned above explained the example which constituted the wiper blade free [movement in a contact position and an evacuation position] to the injection nozzle, this invention is not restricted to this, and when it constitutes so that a wiper blade may always contact an injection nozzle, it can be applied. In this case, what is necessary is just to constitute so that the rotatable of the 1st supporter material may be carried out to both directions.

[0033] Moreover, although the operation gestalt mentioned above explained the example to which the 2nd supporter material is moved by the cam, this invention is not limited to this and you may make it move it by the driving means using the motor etc. However, it becomes easy by using the cam of suction recovery equipment as mentioned above to make suction recovery action and wiping operation perform to desired timing.

[0034] Moreover, although the spring as an energization member was considered as the composition prepared between the 2nd supporter material and the 1st supporter material, as long as this invention can be energized so that it may not be limited to this and the rotation force of the 1st supporter material may be resisted, other composition is sufficient as it. However, a setup of a wiping load becomes easy by constituting like in an above-mentioned operation gestalt.

[0035] Moreover, although the gap of an ink injection head and a form applied this invention to the ink jet printer equipped with the gap adjustment mechanism adjusted corresponding to thickness of paper etc. with the operation gestalt mentioned above, this invention is not limited to this. Since the amount of overlap of an injection nozzle and a wiper blade is changed with the attachment precision of an ink injection head etc. even when it uses for the ink jet printer which is not equipped with the gap adjustment mechanism, stable wiping operation can be made to perform by using the cleaning equipment of this invention. However, when wiping operation which used this invention for the ink jet printer equipped with the aforementioned gap adjustment mechanism, and was always stabilized is enabled, good printing operation corresponding to thickness of paper will much more be performed by the ink injection head cleaned good as mentioned above.

[0036] Moreover, although the operation gestalt mentioned above explained the case where this invention was applied to the cleaning equipment of the ink-jet head with the injection head equipped with the single injection nozzle for monochrome colors, this invention is not restricted to this and can be applied also in the cleaning equipment of the ink-jet head equipped with two or more injection nozzles for colors. in this case, the cap who formed only the number of injection nozzles -- the side of a member may be equipped with cleaning equipment, respectively, and cleaning equipment is set to one and may be made to wipe off continuously at the time of movement of each injection nozzle

[0037]
[Effect of the Invention] As explained above, according to the cleaning equipment of an ink-jet head according to claim 1 So that the elastic contact of the point of a wiper blade may be attained to an ink injection side By and the contact to the ink-jet head and the aforementioned wiper blade accompanying movement of an ink-jet head So that the

aforementioned point may be crooked in the aforementioned move direction, the aforementioned wiper blade may be supported by the 1st supporter material and the force of making the aforementioned wiper blade crooked may be decreased. The supporter material of the above 1st is supported possible [rotation in the aforementioned incurvation direction of the aforementioned wiper blade] to the 2nd supporter material. Furthermore, since the supporter material of the above 1st was energized by the energization member so that the aforementioned rotation force of the supporter material of the above 1st might be resisted and incurvation of the aforementioned wiper blade might be maintained. It cannot be based on the size of the ink injection side of an ink-jet head, and the interval of a wiper blade, but dispersion in the contact angle to the ink injection side of a wiper blade can be made small, and the stable wiping performance can be demonstrated.

[0038] Since a wiper blade is moved to a contact position and an evacuation position to an ink injection side by the 2nd supporter material, while performing the above stable wiping operation at the time of wiping of an ink injection side according to the cleaning equipment of an ink-jet head according to claim 2, at the time of non-wiping, it can consider as an ink injection side and the state where it does not contact, and wiping operation by the desired procedure can be performed. Moreover, contact of an unnecessary wiper blade and an ink injection side can be prevented, and an ink injection side can be prevented from an injury etc.

[0039] According to the cleaning equipment of an ink-jet head according to claim 3 the [aforementioned], since the 2nd supporter material is guided to the cam groove formed on the cam, rotation operation of a cam is interlocked with and a wiper blade is moved to the contact position and evacuation position to an ink injection side. While performing the above stable wiping operation at the time of wiping of an ink injection side, at the time of non-wiping, it can consider as an ink injection side and the state where it does not contact, and wiping operation by the procedure of the request by rotation operation of a cam can be performed. Moreover, linkage with suction recovery action and wiping operation is easily realizable by using the aforementioned cam also [cam / of suction recovery action].

[0040] Since the supporter material of the above 1st is made to energize by the aforementioned energization member with which the supporter material of the above 2nd was equipped according to the cleaning equipment of an ink-jet head according to claim 4, a rotatable and a setup of as opposed to [it is energized, can support and] an ink injection side of the wiping load of a wiper blade can be made easy for the supporter material of the above 1st to the supporter material of the above 2nd.

[0041] Since the aforementioned cleaning equipment was used for the ink-jet type printer equipped with the gap adjustment mechanism according to the cleaning equipment of an ink-jet head according to claim 5, even when the gap of an ink-jet head and a record form is changed, the amount of incurvation of the stable wiper blade is maintained, and stable wiping operation is performed.

[0042] Therefore, good printing operation can be conjointly guaranteed to be an effect by gap adjustment.

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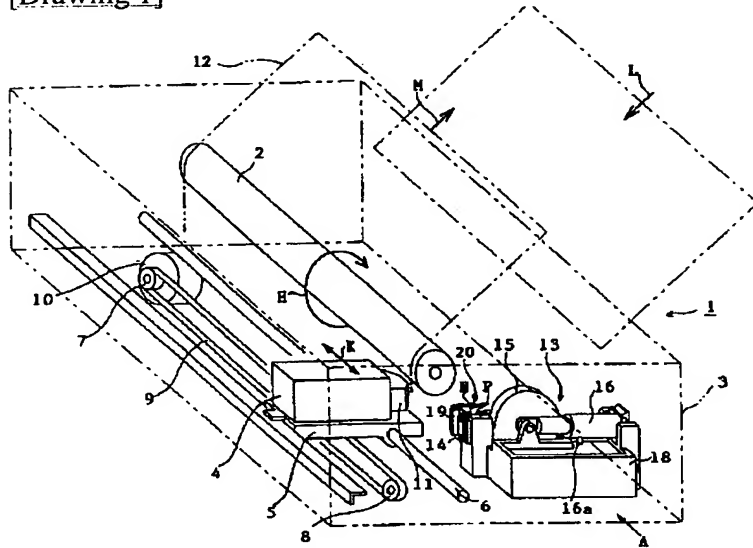
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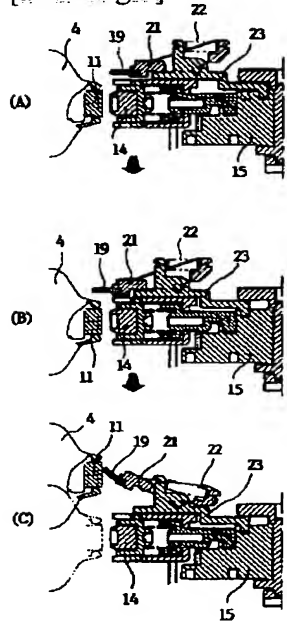
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DRAWINGS

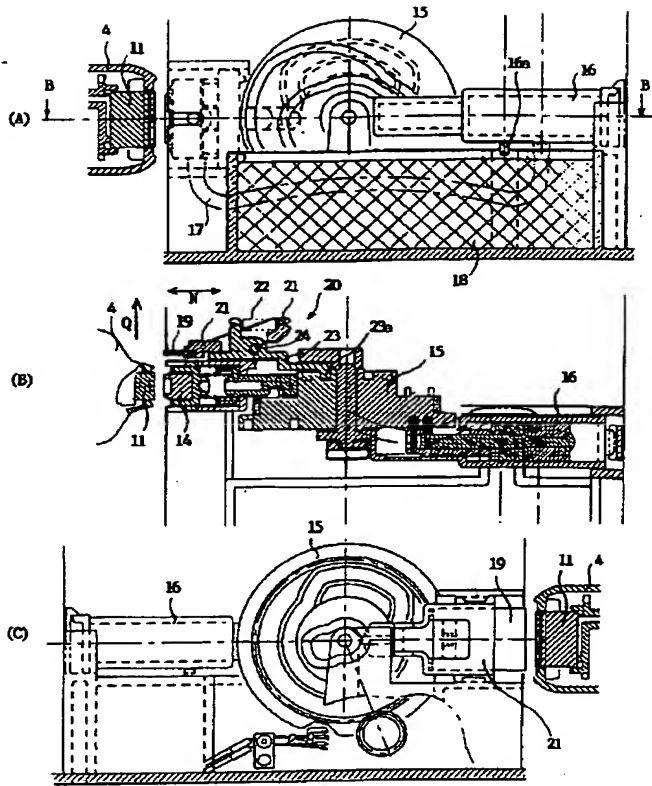
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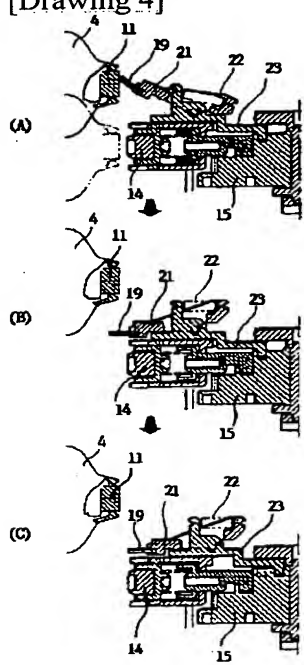
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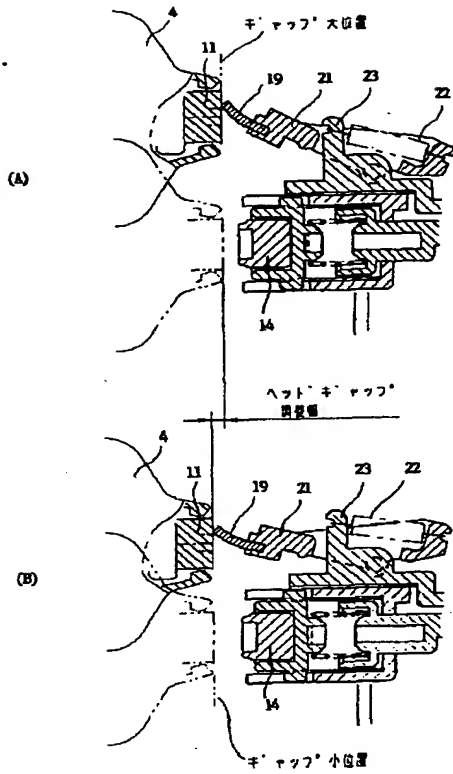
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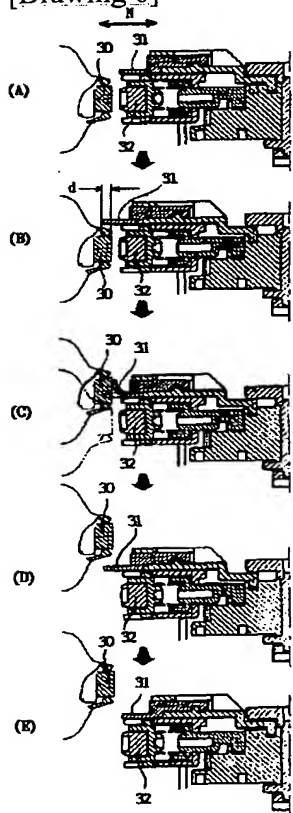
[Drawing 4]



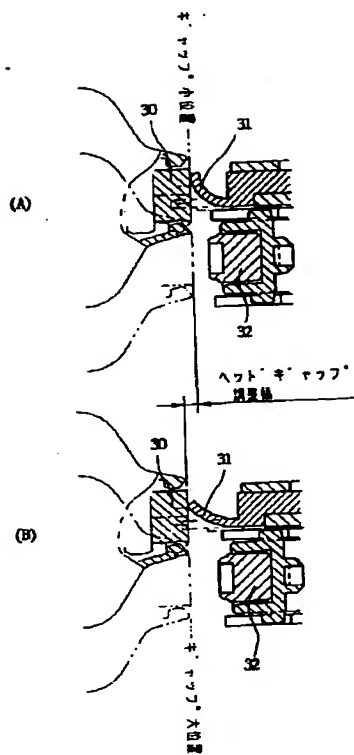
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]